DOCUMENT RESUME

ED 302 072 FL 017 695

AUTHOR Taylor, Marjorie; Gelman, Susan A.
TITLE Word Learning Strategies in Two-Year-Old Children: Evidence for Category Hierarchies.
PUB DATE Aug 88
NOTE 9p.; In: Papers and Reports on Child Language Development, Volume 27; see FL 017 572.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Child Language; *Classification; *Language Acquisition; Language Research; *Learning Strategies; Toddlers; *Vocabulary Development; Word Recognition

ABSTRACT

Three experiments investigated the processes by which 2-year-olds acquire the language to express category hierarchies. The first experiment studied how children use current linguistic knowledge to constrain the potential meanings of new words. This experiment compared interpretations of new words given to objects the children could already name with their interpretations of new words given to novel objects. In the second experiment, the children were taught new words for familiar objects, with the objective of learning why children use a new word for a known object to apply only to the object explicitly named. The third experiment further explored the results of the second, investigating whether children interpreted a new word for a familiar object as a subordinate or contrasting basic category in comparison with known words. The experiments demonstrated that 2-year-old children interpret a new word differently depending on whether they already know a word for the object being named. In addition, the results suggest that 2-year-olds interpret a new noun applied to a familiar object as a subordinate category term, a surprising result because older children have been found to have difficulty with hierarchical relations. (MSE)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

PRCLD 27 (1988)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☒ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED302072

FL017695

WORD LEARNING STRATEGIES IN TWO-YEAR-OLD CHILDREN: EVIDENCE FOR CATEGORY HIERARCHIES

Marjorie Taylor
University of Oregon
Susan A. Gelman
University of Michigan

Ten years ago Susan Carey (1978) described young children as word learning wizards. Her claim was based on research indicating that children rapidly accomplish the complex task of learning their first language with not much in the way of explicit coaching. The problem of accounting for children's ability to master language is exacerbated by the existence of an indefinite number of possible meanings for any word that is defined by ostension (Quine, 1960). Thus, we assume that children must make use of heuristics or strategies to simplify the task of figuring out what a new word means. Here, we have examined in three experiments, how the use of strategies might help children acquire the language to express category hierarchies.

In our first experiment, we investigated the possibility that children use their current linguistic knowledge to constrain the potential meanings of new words. This idea has been proposed by Clark (1983, 1987) in her Lexical Contrast Theory and by Markman in her work on Mutual Exclusivity (Markman, 1987; Markman & Wachtel, 1988). One implication of this idea is that how children interpret a new word should depend in part on whether they already know a word for what is being named. This is the hypothesis we tested in Experiment 1 by comparing children's interpretations of new words given to objects they could already name (e.g., dogs) with their interpretations of new words given to novel objects that were created to be unlike any kind the children might know.

The subjects in this and our other experiments were about two years old (mean age = 2-2), and thus were in the early stages of language acquisition. In all three studies we used the same procedure for teaching children a new word and assessing their interpretation of it. The child was brought into a room where there were four toys. In a brief play session, one of the toys was named six times by the experimenter (e.g., "This is a fep."). To test how children interpreted the new word, we asked the children to perform a series of actions (e.g., "Can you throw a fep in the air?"). There were at least five trials in which children were asked to do something with a [novel word]. On other filler trials, children were just handed a toy for performing the actions. We included these latter trials so that the testing period would not seem to focus exclusively on the named toy. By looking at the toys that children selected when asked to do things with, for example, a "fep", we could get some information about how children had interpreted the new word.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
E. Clark
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Experiment 1 was designed to determine if children interpret a new word for an object differently, depending on whether they already know a name for the object. Children in the unfamiliar condition played with two kinds of unfamiliar stuffed animals. Two of the toys were shaped somewhat like whales, but they had long green tails, round ears, and large eyes. One of these was made from pale green fake fur and one was made from yellow and black plaid material. The other two toys had roughly triangular shapes. These stuffed animals had white hair, red noses and feet, and smiling faces. The experimenter named one of these toys six times (e.g., "This is a fep."). These toys were novel; thus, our expectation was that the children would interpret the new word as a name for the category that included the named object (category being defined by overall shape and parts). A category interpretation of the new word would lead children to pick between the two objects from the named category across the test trials, when children were asked to perform actions with a "fep."

In a second condition, children played with toys that they already knew the names of: two stuffed dogs and two stuffed birds. One of the dogs and one of the birds were made out of pale green fake fur; the other two toys were made out of bright yellow and black plaid material. If children assume that a new word cannot be a synonym for a known word, how will they interpret a new word given to a dog or bird? One possibility is that children might interpret the new word as referring to some property of the object. Using a different paradigm with a different naming context, Markman and Wachtel (1988) found some support for this idea. We were able to assess this possibility because the stimuli in our experiment were designed to allow detection of a property interpretation for the new word, as well as a category interpretation. If "fep" referred to some property of the named object, children should pick the named object and the object made from the same material across the test trials. Our main hypothesis, however, was simply that we would find a difference in how children interpreted the new word as a function of familiarity with the toys.

Table 1 shows the mean proportion of object selections as a function of familiarity of the toys. It is clear from this table that although children in the unfamiliar condition showed a preference for picking the named object, they picked the other object from the named category a significant proportion of the time (.30). This pattern held both within and across subjects - that is, individual children tended to pick both the named object and the other member of the category. This result was consistent with an interpretation of the new word as referring to the category of the named object. Children in the familiar condition, however, picked the named object on almost all the test trials (.84). There was no evidence that they had interpreted the new word as referring to a property of the named object. The differences between the familiar and unfamiliar conditions in the proportions of named

object choices and the proportions of choices of the other object from the named category were significant ($p < .05$). These results support the notion that the way a child interprets a new word depends in part on whether the child already knows a label for the named object. This effect of familiarity was replicated in a second experiment using different stimuli (Taylor & Gelman, 1988).

The results of Experiment 1 indicate that when children learn a new name for an object that already has a known name (e.g., a "fep" for a dog), the new word is used to refer only to the specific object that was named. This result provides evidence that young children set up a contrast between the old and new word, but does not provide any information about how children interpreted the new word. Children's tendency in the familiar condition to use the new word to refer only to the object that was explicitly named could be explained in at least four different ways:

(1) Children interpreted the new word as a proper name for the object. Past research would argue against this possibility because the form class (e.g., a fep) was inconsistent with a proper name interpretation. Even by two years of age, children know that words for categories, but not words for individuals, take an article (Gelman & Taylor, 1984; Katz, Baker, & Macnamara, 1974).

(2) Children narrowed the extension of the familiar category and interpreted the new word as a name for a new contrasting category (e.g., an object that the child initially thought was a dog is now thought to be a fep; furthermore, dogs and feps are nonoverlapping categories). This interpretation is consistent with how Clark (1983) has proposed children eventually narrow down their overextensions (e.g., how children learn to call what they once called "horse" by the name of "zebra").

(3) Children interpreted the new word as referring to a subordinate level category (e.g., a kind of dog). The results of research demonstrating children's difficulty with classification hierarchies (for a review, see Markman & Callanan, 1984) would argue against this possibility.

(4) Children were confused when they heard the new name (a "fep" to refer to a dog) and adopted the conservative strategy of using the new word only in a way they were certain was correct (i.e., to refer to the object that had been explicitly named).

This list is not exhaustive. There is at least one other possibility, namely, that children interpreted the new word as referring to a category that overlapped with the known category. For example, it could be that some but not all feps are dogs and some but not all dogs are feps. The possibility of an overlap interpretation could not be assessed with our present word learning paradigm; however, we were able to assess the four possibilities listed above with Experiments 2 and 3. Experiment 2 provided a way to distinguish among possibilities (1), (2-3), and (4). Experiment 3 provided a way to distinguish possibilities (2) and (3).

In Experiment 2, half the children were taught a new word for a ball and half were taught a new word for a toy dog. By two years of age or younger, children appreciate that some kinds of objects (e.g., dogs) typically get their own special names and some kinds of objects (e.g., balls) do not (Gelman & Taylor, 1984; Katz, Baker, & Macnamara, 1974). Young children do not interpret a word given to a toy like a ball as a name for that particular object, even when the experimenter uses a proper noun construction ("this is Wug"). Thus, if children in this experiment use a proper name interpretation of the new word (explanation # 1), they should adopt this interpretation only when it is semantically appropriate, that is, only when learning a new name for a dog. When an object such as a ball is named, a proper name interpretation should be blocked.

If picking the named toy reflects a subordinate category interpretation (explanation # 3), children's use of the new word should be affected by the degree of similarity among the category exemplars. When two exemplars are similar enough to share subordinate category membership (e.g., two wire-haired terriers that differ only in their sweaters and ribbons), a new word given to one exemplar should be considered appropriate for the other as well. When the exemplars are quite different (e.g., a wire-haired terrier and a basset hound), children should use the new word to refer to the named object only. By varying the similarity of the exemplars of each category, it was possible to test this prediction. A main effect for similarity of category exemplars would also be expected if children interpreted the new word as referring to a category that contrasted with the known category at the same level (explanation # 2).

If children picked the named toy because they were confused about the meaning of the new word (explanation #4), neither type of toy (dog or ball) nor the similarity of category members (similar or different) should affect their performance. In all four conditions, children would be expected to use the new word to refer only to the object that had been named by the experimenter.

32 two-year-old children were randomly assigned to a dissimilar exemplars condition or a similar exemplars condition and learned a new word for a dog or a ball. In the dissimilar exemplars condition, the toys were a wire-haired terrier, a basset hound, a beach ball and a soccer ball. In the similar exemplars condition, the toys were two terriers distinguished by their sweaters and two beach balls that were colored differently. Each child learned a new name for one of the toys and was tested for his or her interpretation of the new name as in Experiment 1. The results of this experiment were consistent with both the subordinate category and contrasting basic category interpretations (2 & 3) for the new word. There was a significant main effect for the similarity of category exemplars, $p < .01$. When the exemplars were similar, children tended to choose both the named object and the object from the same category when asked to do things with a

[novel word]. When the exemplars were dissimilar, children tended to choose only the named object (see Table 2).

According to the results of Experiment 2, children interpret a new word given to a dog as a subordinate category like terrier or as a contrasting basic category like wolf. To distinguish these two possibilities, we tested eight additional two-year-old children, using the toys that had been used in the Dissimilar Exemplars condition of Experiment 2. The purpose of Experiment 3 was to determine whether children who learned a new word for a familiar object would still consider the object to be an appropriate referent of the old word. The naming portion of this experiment was identical to that of Experiment 2. However, in the testing portion children were tested on the conventional label for the named object ("dog" or "ball") rather than on the novel word they had just learned. Then, at the end of the session, the experimenter asked the child to point to a [novel word]. If children interpreted the new name as a subordinate category label, then the old name (e.g., "dog") still applies to the named object. However, if the new name was interpreted as referring to a previously unknown contrasting category, the old name should no longer be considered correct.

All eight children in this experiment selected both members of the named category when asked to perform the series of actions with a dog or ball, as shown in Table 2. Thus, learning a new word did not induce a restructuring in children's understanding of the already known category label. When asked to point to a [novel word] at the end of the session, five children correctly picked the named toy (two children who had been taught a new name for a ball and three who had been taught a new name for a dog). The other three children gave no response. A binomial test on these data was significant, $p < .05$, indicating that picking the named toy occurred more often than predicted by chance. Thus, most of the children still remembered the new label at the end of the procedure. Taken together, the results of Experiments 2 and 3 suggest that children readily interpret a new name for a familiar object as a subordinate category label, without revising their interpretation of the familiar word.

Conclusions

With these three experiments we have demonstrated that two-year-old children interpret a new word differently depending upon whether they already know a word for the object being named. In addition, our results are consistent with the idea that two-year-old children tend to interpret a new noun given to a familiar object as a subordinate category term like terrier or collie. This finding is somewhat surprising, given that older children in other contexts often demonstrate difficulty with hierarchical relations (see R. Gelman & Baillargeon, 1983; Markman & Callanan, 1984, for reviews).

We believe that two-year-old children were able to construct a simple hierarchy in our studies because the context of our procedure was particularly supportive of a subordinate category interpretation for the new words the children learned. In particular, the basic level categories were ones that were likely to have been well established (e.g., dogs and balls) and the subordinate level distinctions were perceptually very clear. In contrast, Merriman's (1986) failure to find subordinate category interpretations for new words may have been related to the fact that his subjects were required to learn names for both levels of the hierarchy in the same session. In addition, when the distinction between different subordinate level categories is perceptually subtle (e.g., the placement of two protrusions and a small shape on an abstract geometric form), children have considerable difficulty in learning the categories (Mervis & Crisafi, 1982).

The ability of our subjects to construct a hierarchy may also have been helped by the fact that the task in these experiments was fairly simple. Children were not required to display understanding of the asymmetry of inclusion hierarchies, as in the Piagetian class-inclusion problem (Inhelder & Piaget, 1964). Children were not asked to sort objects into groups, which is a task that requires children to hold in mind simultaneously at least two categories and to apply a criterion both consistently and exhaustively, while often imposing additional information processing demands as well (Markman & Callanan, 1984). Rather, children were simply asked to identify at least one instance of each category in question. An important corollary to this point is that we certainly do not claim that children appreciate the asymmetry of hierarchical relations, nor even that they can necessarily keep in mind both levels of a hierarchy at once. Rather, we suggest that children are learning the language of hierarchies in an accurate manner, and so can represent more than one hierarchical level by means of language.

These results have direct implications for recent theories concerning children's strategies in acquiring new words. We found evidence for lexical contrast in young two-year-old children; when children heard a new word given to an object with a familiar label, they did not treat the new and old words as synonyms. Thus, children's interpretation of the new word was partly constrained by their knowledge of a familiar word for the same object. However, children did not assume mutual exclusivity; inclusion relations specifically violate mutual exclusivity because the higher and lower level terms refer to partly overlapping sets. Taken in conjunction with other recent findings on early word learning, it appears that children are capable of appreciating a wide range of semantic relations from a very young age, including hierarchical inclusion (this work), mutually exclusive contrast (Markman, 1987; Markman & Wachtel, 1988), and overlap (Merriman, 1986).

Table 1

Mean proportion of object selections as a function of familiarity (Experiment 1)

	Named toy	Same category	Same material	Other
Familiar (n = 8)	.84	.09	.06	.01
Unfamiliar (n = 8)	.59	.30	.06	.05

Table 2

Mean proportion of object selections as a function of similarity

	Named Toy	Other toy from same category	Other
EXPERIMENT 2: Novel name			
Similar exemplars	.68	.32	.00
Dissimilar exemplars	.96	.04	.00
EXPERIMENT 3: Conventional name			
Dissimilar exemplars	.47	.53	.00

Acknowledgments

Funding for this project was provided by a grant from the Department of Psychology, University of Oregon, awarded to the first author and by a Spencer Fellowship awarded to the second author. We are grateful to the children, parents, and teachers who made this research possible. We also thank Tom Bowden for his assistance and Jean Hutchinson, Peter Juscyzk, Lawrence Maloney, Gregory Murphy, and Nancy Soja for helpful comments.

References

Carey, S. (1978). The child as word learner. In M. Halle, J. Bresnan, & G. Miller (Eds.), Linguistic theory and psychological reality (pp.264-293). Cambridge, Mass.: MIT Press.

Clark, E.V. (1983). Meanings and concepts. In J. H. Flavell & E. M. Markman (Eds.), Cognitive development, Vol. 3 of P.H. Mussen (Gen. Ed.), Handbook of child psychology (pp. 787-840). New York: Wiley.

Clark, E. V. (1987). The principle of contrast: A constraint on language acquisition. In B. MacWhinney (Ed.), Mechanisms of language acquisition. Hillsdale, NJ: Erlbaum.

Gelman, S. A., & Taylor, M. (1984). How two-year-old children interpret proper and common names for unfamiliar objects. Child Development, 55, 1535-1540.

Inhelder, B., & Piaget, J. (1964). The early growth of logic in the child. New York: Norton.

Katz, N., Baker, E., & Macnamara, J. (1974). What's in a name? A study of how children learn common and proper names. Child Development, 45, 469-473.

Markman, E. M. (1987). How children constrain the possible meanings of words. In U. Neisser (Ed.), Concepts and conceptual development: Ecological and intellectual factors in categorization (pp. 255-287). Cambridge: Cambridge Univ. Press.

Markman, E. M., & Callanan, M. A. (1984). An analysis of hierarchical classification. In R. Sternberg (Ed.), Advances in the psychology of human intelligence, Vol. 2 (pp. 325-365). Hillsdale, NJ: Erlbaum.

Markman, E. M., & Wachtel, G. A. (1988). Children's use of mutual exclusivity to constrain the meanings of words. Cognitive Psychology, 20, 121-157.

Merriman, W. E. (1986). Some reasons for the occurrence and eventual correction of children's naming errors. Child Development, 57, 942-952.

Mervis, C. B., & Crisafi, M. A. (1982). Order of acquisition of subordinate, basic, and superordinate level categories. Child Development, 53, 258-266.

Quine, W. V. O. (1960). Word and object. Cambridge: MIT Press.

Taylor, M., & Gelman, S. A. (1988). Adjectives and nouns: Children's strategies for learning new words. Child Development, 59, 411-419.

Waxman, S. R., & Gelman, R. (1986). Preschoolers' use of superordinate relations in classification. Cognitive Development, 1, 139-156.